

CLAIMS:

1. An electrical feed-through structure (EFTS) comprising:
a sheet of insulating material, the sheet including at least one
5 embedded layer of conductive tracks, the conductive tracks extending from a
first portion of the sheet to a second portion; and
a vacuum seal made to the sheet so as to separate the first and second
portions and permit evacuation of a first volume in contact with said first
portion whilst a second volume, in contact with said second portion, is
10 maintained at higher pressure.

2. An EFTS in accordance with claim 1, wherein said sheet includes at
least two embedded layers of conductive tracks.

15 3. An EFTS in accordance with claim 2, wherein the or each embedded layer
comprises at least 100 conductive tracks.

20 4. An EFTS in accordance with claim 2, wherein said sheet comprises
insulating material selected from the following list: silicon; printed-
circuit-board material; glass.

25 5. An EFTS in accordance with claim 2, wherein said sheet is substantially
rigid.

6. An EFTS in accordance with claim 2, wherein said sheet is a sheet
formed by depositing alternate layers of insulating and conductive material
onto a substrate.

30 7. An EFTS in accordance with claim 2, wherein said sheet is a flip-chip
spreader board.

8. An EFTS in accordance with claim 2, wherein said sheet is a circular
wafer, and said first portion is a circular or annular portion centred on the
wafer.

35 9. An EFTS in accordance with claim 8, wherein said sheet has a central
aperture.

10. An EFTS in accordance with claim 9, wherein the sheet comprises via holes in the first and second portions, extending from a surface at the sheet to respective embedded tracks to permit connections to be made to the tracks.

5 11. An EFTS in accordance with any claim 9, wherein said vacuum seal is annular, the first portion of the sheet being inside the annular seal, and the second portion being outside.

10 12. An EFTS in accordance with claim 11, wherein said vacuum seal comprises a first generally annular clamping member in contact with a first surface of the sheet.

15 13. An EFTS in accordance with claim 12, wherein said vacuum seal comprises a second generally annular clamping member in contact with a second surface of the sheet, said second surface being opposite the first, and said first and second generally annular members being arranged in register to clamp an annular portion of said sheet between them.

20 14. An EFTS in accordance with claim 13, wherein the vacuum seal comprises a sealing compound.

25 15. Lithography apparatus comprising:
an e-beam source comprising an array of tips, and having a plurality of control terminals to enable selective control of emission from said tips the source being positioned in an evacuable volume; and
an electrical feed-through structure in accordance with any preceding claim, arranged such that said second portion is inside the evacuable volume, and said first portion is outside the evacuable volume,
wherein said control terminals are connected to said tracks in the first portion, the apparatus further comprising e-beam source control electronics arranged outside said evacuable volume, and connected to said tracks in the second portion.

30 16. Use of a multi-layer interconnect structure as an electrical feed-through into a vacuum environment, the multi-layer interconnect structure comprising a sheet of insulating material, the sheet including at least one embedded layer of conductive tracks, the tracks extending from a first portion of the sheet to a second portion.

17. A method of operating an electrical device in a vacuum environment, the device having a plurality of terminals and the method comprising the steps of:

5 providing an interconnect structure comprising a sheet of insulating material, the sheet including at least one embedded layer of conductive tracks, the tracks extending from a first portion of the sheet to a second portion;

10 positioning the electrical device generally over the first portion of the sheet;

forming electrical connections between said terminals and said tracks in the first portion;

15 forming a vacuum seal to the sheet to include the device inside the seal and to separate the first portion from the second portion;

forming a plurality of external connections to the tracks in the second portion of the sheet;

evacuating a volume inside the vacuum seal, said volume including said device; and

operating said device via said external connections.

20 18. A method in accordance with claim 17, wherein said vacuum seal is annular.